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SIX NEW EAST INDIAN CRINOIDS BELONGING TO  
THE FAMILY CHARITOMETRIDÆ.

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In an earlier paper in this volume (pp. 17-28) I described seventeen new crinoids belonging to the families Comasterida and Zygometrida which had been discovered in the East Indies by the Dutch steamship *Siboga*. The present paper deals with the new species of Charitometrida in the same collection.

Preliminary descriptions of the new forms in the remaining families will be found in the current volumes of the "Notes from the Leyden Museum," the "Zoologischer Anzeiger," and the "Annals and Magazine of Natural History."

FAMILY CHARITOMETRIDÆ.

*Pachylometra crassa* sp. nov.

This form is nearest to *P. flexilis*, but it possesses stouter cirri which have rather prominent dorsal processes distally, and the arm bases are much smoother, the axillaries and corresponding ossicles being without the characteristic median tubercles and rounded posterior processes.

The centrodorsal is very large, truncated conical, the sides making a rather small angle with each other, 9 mm. in diameter at the base, 5 mm. across the irregularly convex dorsal pole, and 5 mm. high; the cirrus sockets are arranged in ten columns, usually three to a column, the columns being closely crowded interradially, slightly separated radially.

The cirri are about xxv, 18-22 (usually 20), 32 mm. long, stout and short segmented; the first segment is short, and the following gradually increase in length so that the sixth and following are nearly as long as broad, those in the outer third of the cirri being slightly shorter again; on the seventh a slight broad subterminal dorsal hump makes its appearance which slowly increases in height so that the terminal nine possess a prominent broad blunt and well rounded subterminal tubercle which

becomes more pointed on the last two or three before the penultimate; the opposing spine is small, subterminal, resembling the tubercle on the preceding segment, but arising from a much smaller base.

The radials and the ends of the basal rays are concealed; the  $iBr_1$  are very short, broadly V-shaped, sometimes concealed in the median line so that only the lateral portions are visible; the dorsal surface is more or less irregular; the axillaries are short and broad, nearly three times as broad as long, rhombic, the lateral angles truncated so that the lateral sides are nearly or quite as long as those of the  $iBr_1$ .

The arms are ten or eleven in number, about 180 mm. long; the first two brachials are about equal in size, slightly wedge-shaped (more pronouncedly so on the second), about three times as broad as the median length; the synarthrial tubercles are scarcely marked; the brachials have slightly produced distal edges and a more or less swollen dorsal surface.

*Type locality*.—"Siboga" Station No. 259.

#### ***Pachylometra helius* sp. nov.**

This new form is nearest *P. septentrionalis* of Japan, but it is of more delicate build with much more slender cirri and with the dorsal surface of the division series and arm bases strongly convex and perfectly smooth without any trace of median carination or of tubercles.

The centrodorsal is of moderate size, flattened hemispherical or thick truncated conical, 6 mm. in diameter at the base, 3 mm. across the flat dorsal pole and 4 mm. high; the cirrus sockets are arranged in ten equally separated columns of two or three each.

The cirri are about xxv, 23, about 28 mm. long; the first segment is short, the following gradually increasing in length to the fifth and sixth which are the longest, between one third and one half again as long as broad; the following segments very slowly decrease in length so that those in the distal third of the cirri are about as long as the distal diameter; in the distal third of the cirri the median portion of the distal dorsal edge of the segments is somewhat swollen, this on the last five or six before the penultimate becoming a blunt subterminal dorsal tubercle; the opposing spine is prominent, short, sharp, terminal, directed obliquely forward.

The ends of the basal rays are visible as large rhombic tubercles in the angles of the calyx; the radials are entirely concealed; the  $iBr_1$  are very short, broadly V-shaped with the proximal and distal edges parallel; the lateral thirds of the proximal and distal edges are slightly produced; the axillaries are very short, nearly or quite three times as broad as long, rhombic in shape with concave sides and truncated lateral angles, the lateral edges being as long as those of the  $iBr_1$ ; the lateral edges and all but the median portion of the proximal edge are very slightly produced; the synarthrial tubercles are low and broad, scarcely evident.

The basal contour of the animal is broadly rounded, exactly like that of *P. septentrionalis*.

The twenty-six arms of the type are 125 mm. long; there are seven  $iiBr_4$  (3 + 4) and three  $iiBr_2$  series; the  $iiiBr$  series are 2, internally

developed except for one which is external by the side of an internal 11 Br series.

*Type locality*.—"Siboga" Station No. 254.

### **Pachylometra fragilis** sp. nov.

The centrodorsal is low, flattened hemispherical, 7 mm. in basal diameter and 3 mm. high; the cirrus sockets are closely crowded, in two or three irregular rows and approximately fifteen columns, three in each radial area; the cirrus sockets touch the proximal border of the centrodorsal.

The cirri are about xxx, 17-18, 30 mm. to 35 mm. long, moderately slender; the first four segments are short, the fifth is half again as long as broad; the sixth-eighth are the longest, twice as long as broad; the following slowly decrease in length becoming about as long as broad distally and then increase again so that the penultimate and antepenultimate are about twice as long as broad; the earlier longer segments have slightly prominent ends, and the shorter distal segments have the distal dorsal margin slightly swollen.

The subradial clefts are deep, but very narrow; the ends of the basal rays are visible as large and prominent rhombic areas in the angles of the calyx; the radials are very short, strongly curved, with a low broad obscure median tubercle; the 1 Br<sub>1</sub> are extremely short, band-like, with an obscure low median tubercle; they are produced inward toward the center of the calyx so that their sharply flattened lateral edges almost meet, being separated only by a narrowly V-shaped cleft running to the edge of the inner edge of the synarthrial joint face; though the dorsal surface of the segment is well rounded the distance from the central canal to the median part of the dorsal edge is not so great as the distance from the central canal to the inner angle; counting the entire median length of the joint face the broadest portion is found to be scarcely more than one third of the distance from the dorsal edge to the inner angle; the ossicle is sharply "wall-sided" from its widest point inward; the axillaries are low, rhombic, with the lateral angles truncated so that the lateral edges are about as long as the lateral edges of the 1 Br<sub>1</sub>, twice as broad as long; there is an obscure well rounded median carination; the distal angle is produced, but broad; the dorsal surface is rather strongly convex; the lower portions of the axillaries are strongly produced inward so that, like the 1 Br<sub>1</sub>, the inner sides are reduced almost to apices which almost meet the similar inner ends of the other axillaries; from this central point the inner face of the axillaries slopes away almost horizontally so that the inner faces of the axillaries, together with the division series, form the platform upon which the visceral mass rests; the sides of the inner half of the axillaries are sharply "wall-sided"; the 11 Br series are similar to the 1 Br series, but rapidly decrease in dorsoventral width; they are sharply flattened laterally for somewhat more than their inner half; the first two brachials are flattened laterally for their entire inner side and the third and fourth are flattened on the inner portion of the inner side.

P<sub>1</sub> is 9 mm. or 10 mm. long, slender and evenly tapering, with from twenty-six to thirty-one segments all of which are much broader than long; P<sub>2</sub> is similar, very slightly stouter, of the same length or very slightly longer, with twenty-five segments of which the outermost are about as long as broad; P<sub>3</sub> is 11 mm. long with twenty-two segments, resembling P<sub>2</sub>, but with the segments in the distal half about as long as broad; P<sub>4</sub> is 11 mm. long with twenty segments which become about as long as broad on the fifth or sixth and slightly longer than broad terminally; P<sub>5</sub> is 9 mm. long with fifteen segments, most of which are about as long as broad; P<sub>6</sub> is 8 mm. long with fourteen segments; P<sub>7</sub> is 7 mm. long with thirteen segments; in the genital pinnules the third-seventh segments are just perceptibly broader than those following; the distal pinnules are very slender, 10 mm. long with twenty segments.

*Type locality.*—"Siboga" Station No. 166.

### ***Glyptometra timorensis* sp. nov.**

This new species is nearest to *G. lata* of southern Japan, but the cirri are shorter and slightly stouter, with shorter segments, and the ornamentation of the ossicles of the 1Br series and of the proximal brachials is much more smooth and regular; there is none of the coarsely tubercular rugosity characteristic of *G. lata*.

The centrodorsal is very thick discoidal, the sides sloping slightly inward, 6.5 mm. in diameter at the base and 3 mm. high; the cirrus sockets are arranged in ten columns of two each, the columns being closely crowded against each other and showing no differentiation into pairs.

The cirri are xx, 17-20, 20 mm. to 25 mm. long, stout; the first segment is very short, the following gradually increasing in length to about the seventh, which, with the following, is about twice as broad as the median length, or, in the longest cirri, half again as broad as the median length; the dorsal profile of the segments beyond the seventh or eighth is convex, becoming gradually more strongly so toward the end of the cirri.

The ends of the basal rays are visible as flat triangular or irregular areas in the angles of the calyx; the radials are entirely concealed or are slightly visible as small irregular tubercles or flat irregular areas in the angles of the calyx; the 1Br<sub>1</sub> are short, broadly chevron-shaped, the proximal and distal borders parallel, about four times as broad as long; the proximal edge is produced into a thin border overlapping and concealing the proximal portion of the centrodorsal, though flush with its general surface; the border of this produced proximal edge is usually irregularly scalloped or bears a few low coarse teeth, though it may be nearly plain; it sometimes bears a few low tubercles; it may be evenly curved, becoming horizontal just over the ends of the basal rays, or it may be regularly curved in its lateral thirds but nearly straight in its median third; the middle of the dorsal surface of the 1Br<sub>1</sub> is occupied by a large prominent broadly oval well rounded tubercle; the axillaries are broadly rhombic with the lateral angles truncated so that the lateral edges are from one half to two thirds the length of the sides of the 1Br<sub>1</sub>,

two and one half times as broad as long, in the median line nearly twice as long as the 1 Br<sub>1</sub>; the center, except at the anterior angle, is occupied by a tubercle which is more elongated dorsoventrally than that on the 1 Br<sub>1</sub> and, though as high, less prominent as it rises much less abruptly; the lateral edges of the 1 Br<sub>1</sub> and 1 Br<sub>2</sub> are turned outward, but not nearly so strongly as is the case in *G. lateralis*; the lateral thirds of the proximal edge of the axillaries and the corresponding portions of the distal edge of 1 Br<sub>1</sub> are also turned upward to the same height as the lateral edges; the eversion of the latter is most marked just over the ends of the basal rays and gradually decreases anteriorly to the distal corner of the lateral edge of the axillary; it is continued thence along the sides of the first four brachials; the inner lateral edges of the first five brachials are similarly modified.

The ten arms are, in the type, 165 mm. long.

*Type locality*.—"Siboga" Station No. 297.

### **Strotometra priamus** sp. nov.

The centrodorsal is very low hemispherical, almost discoidal, 1.5 mm. to 2 mm. in diameter; the cirrus sockets are arranged in one and a partial second marginal row, alternating and closely crowded.

The cirri are XVII, 11-12, 8 mm. to 11 mm. long, slender, with elongated segments; the first segment is very short, dorsally expanded into a rounded knob-like process; the second is not quite so long as broad; the third is twice as long as the median diameter; the remainder are very slightly shorter, becoming a trifle longer again, about two and one half times as long as broad, on the antepenultimate and penultimate; the penultimate is less in lateral diameter than the preceding; the third and following are moderately constricted centrally with prominent distal ends, this feature gradually decreasing distally; there are no dorsal processes; the opposing spine is prominent, terminal, directed obliquely forward, the proximal profile convex and the distal concave; the base occupies only slightly more than one third of the dorsal surface of the penultimate segment.

The ends of the basal rays are visible as small but prominent tubercles in the angles of the calyx; the radials are concealed by the centrodorsal; the 1 Br<sub>1</sub> are short, about four times as broad as long in the median line; the proximal border is slightly convex, usually becoming straight in the lateral quarters; the lateral edges of each 1 Br<sub>1</sub> make a considerable angle with each other, but are in close apposition with those of the adjacent 1 Br<sub>1</sub>; they are turned outward and produced as in *Glyptometra lateralis*; the distal edge is sometimes obscurely scalloped in the lateral thirds, and is slightly concave centrally for the receipt of a rounded posterior process from the axillary; the axillaries are exceedingly short, about two and one half times as broad as long; their lateral edges form a continuous line with those of the 1 Br<sub>1</sub> and are about half as long as the latter; they are similarly turned outward and produced, this feature continuing inward

along the proximal border about as far as the median third; the distal edges are slightly everted.

The ten arms are 40 mm. long; the first brachial has the proximal and distal edges parallel; it is in close apposition with its neighbors both internally and externally; the proximal edge is slightly everted; the outer edge is turned outward and produced, like the outer edges of the preceding ossicles; the inner edge is similarly, though less, turned outward and produced; the synarthrial tubercles are small and well rounded, but rather prominent; the second brachial is similar to the first, but about twice as long exteriorly as interiorly; the third and fourth (the first syzygial pair) are together roughly oblong, about two and one half times as broad as long, their lateral edges being modified as in the two preceding; the following three brachials are wedge-shaped, about twice as broad as the maximum length, with the dorsal surface convex and the distal edge therefore prominent; after the tenth the brachials become triangular, about as long as broad, later very obliquely wedge-shaped and toward the end of the arms twice as long as broad.

P<sub>1</sub> is 6 mm. long with thirty-five segments, very slender and delicate, resembling, except for the absence of the enlargement of the first two segments, P<sub>1</sub> in *Calometra*; the earlier segments are broader than long, the seventh or eighth and following about as long as broad; P<sub>2</sub> is 6 mm. long with eighteen segments of which the sixth-eleventh are greatly produced ventrally forming a roof over the gonads, which are also protected by a heavy ventral plating; the terminal seven segments are very small and delicate; P<sub>3</sub> is similar, 4.5 mm. long with fourteen segments, of which the sixth-tenth are greatly expanded; P<sub>4</sub> is 4 mm. long with thirteen segments, the fifth-ninth expanded; P<sub>5</sub> is 3 mm. long with ten segments, none of which are expanded; the distal pinnules are 5 mm. long with eleven or twelve segments.

*Type locality*.—"Siboga" Station No. 266.

#### ***Strotometra ornatissimus* sp. nov.**

The centrodorsal is flattened hemispherical 2.5 mm. in proximal diameter, with the dorsal pole slightly convex; the cirrus sockets are arranged in one and a partial second closely crowded and irregular marginal row.

The cirri are about xv (there are twenty-two cirrus sockets, but some of them are not of full size); the longest stump is 4.5 mm. to the distal dorsal edge of the fifth segment; the first segment is about twice as broad as long, the second about as long as the median diameter, centrally constricted, the third about twice as long as the median diameter centrally constricted with the distal end especially prominent as in the second, the fourth about three times as long as the median diameter, similar to the third, the fifth similar to the fourth but not quite so much constricted centrally and hence appearing slightly broader in lateral view.

The radials are just visible beyond the edge of the centrodorsal; the 1 Br<sub>1</sub> are short, about four times as broad as the median length, the proximal border produced into a thin straight margin, the lateral borders

slightly more produced and turned outward; the axillaries form a broad inverted "V"; the lateral edges, which are half again as long as those of the 1Br<sub>1</sub> are, like them, turned outward and are straight or bear two or three broad scallops; the lateral thirds of the proximal border are produced and extended downward over the distal border of the 1Br<sub>1</sub> with a scalloped or tubercular edge which is nearly parallel to the corresponding distal face; the distal sides of the axillaries are plain and unmodified.

The ten arms are about 40 mm. long; the first brachial has the proximal and distal edges parallel, the outer edge slightly produced and faintly scalloped, the inner edges in apposition, in their distal half everted and scalloped; a similar distance of the inner portion of the distal edge is similarly everted and scalloped, and the internal distal angle is rounded, so that the inner distal angle is produced into a rounded thin scalloped process; the proximal and distal borders, other than above described, are unmodified; the second brachial is about as large as the first, slightly wedge-shaped; the distal edge is everted and stands out at right angles to the dorsoventral axis of the arm as an enormous thin rounded or fan-shaped crest with a rounded or broadly scalloped edge, sometimes divided in the middle, which may reach 1.5 mm. in height, or three or four times the greater (outer) length of the ossicle; the proximal outer corner of the ossicle is slightly produced over the distal outer corner of the first brachial, and is scalloped or slightly tuberculated; the produced inner distal angles of the first brachials reach as far as the base of the distal crest on the second; the third brachial (the hypozygal of the first syzygial pair) is oblong, unmodified, very short, five or six times as broad as long; the fourth brachial (the epizygal of the first syzygial pair) is very short, oblong, little if any larger than the preceding brachial, but with the distal border everted and produced into an enormous crest similar to, and nearly or quite as large as, that on the second brachial; the fifth brachial is slightly wedge-shaped with a crest about half as high as that on the preceding brachial and more irregular; the sixth brachial has a strongly produced and thickened distal edge which is coarsely scalloped; the seventh brachial is slightly wedge-shaped, two to two and one half times as broad as long, unmodified, with the distal edge slightly produced and finely spinous; after the tenth or twelfth the brachials become triangular, about as long as broad, and after four or five more very obliquely wedge-shaped and longer than broad, less obliquely wedge-shaped and longer distally; the brachials beyond the sixth are almost smooth, with only slightly produced and finely spinous distal ends.

*Type locality.*—"Siboga" Station No. 122.

